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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,811	09/10/2003	Yasuo Matsumura	117092	2869
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			1756	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,811

Applicant(s)

MATSUMURA ET AL.

Examiner

Christopher RoDee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/10/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-17, drawn to a toner, classified in class 430, subclass 109.3.
- II. Claim 18, drawn to a process for preparing a toner, classified in class 430, subclass 137.14.
- III. Claims 19 and 20, drawn to an image forming method, classified in class 430, subclass 124.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, such as mixing the binder resin, a colorant, wax, and other additives together in a melt kneading process, cooling the resultant mixture, pulverizing the cooled mixture, attriting, classifying the pulverized mixture, and then subjecting the classified mixture to an impact treatment to give generally spherical toner particles.

Inventions I and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in another and materially

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different process, such as sprinkling the toner on an ionographic image formed on a dielectric surface to form a toner image and placing a clear coversheet over the formed toner image to fix the image on the dielectric surface to form a sign.

Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as in an ionographic process as described above. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Julie Seaman on 12 April 2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for binder resins formed from most of the claimed monomers given by the formula 1-3, does not reasonably provide enablement for a polymer formed from a monomer having a formal group in any of the R positions. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. As seen in the enclosed citation to Alger (*Polymer Science Dictionary*, pp. 385-6), a polyvinylformal is produced from the reaction of an aldehyde with polyvinylalcohol. This gives the ring structure for the formal group. There is no known vinyl formal monomer, which could be used to form a polymeric vinyl formal unit noting the requisite three-carbon chain in the polymeric vinylformal unit. The claimed monomers of the formula 1-3 could not give such a three unit chain because only two carbon atoms are present in the monomeric unit. As further evidence that vinyl formal itself does not exist see the enclosed citation from Chemical Abstracts Registry database. There is no registered substance known as vinyl formal, which would correspond to the simplest monomer having a formal group in the formulae 1-3. Because vinyl formals are not known compounds and the claims fails to disclose how to make such a monomer the claims that include these compounds are not enabled.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The toner in these claims is further defined with respect to several features including the crosslinking temperature of the cyclic reactive group. The crosslinking temperature of the reactive polymer is based on the highest temperature obtained during manufacture of the toner. The claims are indefinite because the highest temperature obtained during formation of the toner is unknown to the artisan when considering the toner. Because the artisan would not know the temperature used to produce the toner the same artisan would not be reasonably able to determine if a toner met the scope of the claims.

For example, a consumer inspecting a toner to determine if it infringed on claims issuing from this application would have little or no knowledge of the manner in which the toner was obtained and, particularly, little or no knowledge of the highest temperature obtained during manufacture of the toner. As such, the consumer could not reasonably know if a toner met the requirements of the claims.

The claims as presented are indefinite because they define the composition of the toner on an indefinite and unknown process condition. For the purposes of examination the claims will be interpreted as permitting any temperature.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-8, 14, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsubuko *et al.* In US Patent Application Publication 2003/0099894 considered with *Polymer Handbook*, 2nd ed, pp. III-143 – III-179.

Tsubuko's Example 6 discloses a liquid toner having as a binder resin a copolymer of lauryl (dodecyl) methacrylate, methyl methacrylate, methacrylic acid, and glycidyl methacrylate. As seen on specification pages 19 and 20, methyl methacrylate is a high Tg monomer, dodecyl methacrylate is a low Tg monomer, and methacrylic acid is a hydrophilic monomer. The toner also contains a paraffin that functions as a release agent and is mixed in a carrier liquid to form the developer.

Example 7 produces a similar toner except that stearyl (octadecyl) methacrylate is the low Tg monomer (homopolymer Tg = 173 K; see *Polymer Handbook*, p. III-148). This example is not applicable to claims 6 and 7.

Example 13 produces a toner having as a binder resin a copolymer of stearyl (octadecyl) methacrylate, methyl methacrylate, methacrylic acid, and glycidyl methacrylate. Example 14 produces a toner from lauryl (dodecyl) methacrylate, ethyl methacrylate (high Tg monomer, spec. p. 19), acrylic acid (hydrophilic monomer, spec. p. 20), and glycidyl methacrylate.

Each toner is made by a wet process.

Claims 1-5, 8, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 9-185182.

The JP document discloses a toner comprising two resins. Exemplified resin A is formed from methyl methacrylate (high Tg monomer), ethylhexy methacrylate (low Tg monomer), and acrylic acid (hydrophilic monomer) (see ¶ [0053]; spec. pp. 19-20). The resin has a Mw of from 50,000 to 500,000 (¶ [0035]). The Mw at 50,000 is disclosed with sufficient specificity to place it within the artisan's possession.

Claims 1-5, 8, 11, 14, 16, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-015197.

This JP document discloses a two-component developer comprising a toner and a carrier. The carrier contains a binder resin, a colorant, and a release agent wax. Exemplified resin A2, B2, and C2 contain as monomer components butyl acrylate (low Tg monomer), methyl methacrylate (high Tg monomer) and methacrylic acid (hydrophilic monomer) (¶¶ [0050], [0052], [0054]). These resins are mixed with resin A1 and this mixture is combined with a polyethylene wax, carbon black, a quaternary ammonium charge control agent, and a magnetic powder to form the final toner (¶ [0060]). The toner has a disclosed size of from 6 to 12 μm (¶ [0040]) and is combined with a carrier having a diameter of 55 μm to give the developer (¶ [0066]).

Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsunaga *et al.* in US Patent 5,262,265.

Matsunaga discloses a toner comprising a binder resin having a mixture of resin (A) and resin (B) (Abstract). Exemplified resin (A) in Example 2 is formed from a mixture of butyl acrylate (low Tg monomer), methyl methacrylate (high Tg monomer) and methacrylic acid (hydrophilic monomer) (see col. 11, l. 39-47; spec. pp. 19-20). In Experiment 2 this polymer is mixed with resin (B-2), which is formed from polymerization of glycidyl acrylate and styrene, and

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carbon black. The components are then melt kneaded and pulverized to form the toner.

Although the artisan would expect some crosslinking of the acid group in resin (A) and the epoxy group in resin (B), the reference specifically states, "The aforementioned characteristics are attributed to an increase in the molecular weight of the resin constituents resulting from the progress of cross-linking reactions between resin (A) and resin (B) during the toner manufacturing process and the toner utilization process (i.e., fixing by a hot roller)" (col. 10, l. 24-34). Emphasis added. The artisan would expect there would be some unreacted (i.e., uncrosslinked) epoxy and acid groups in the toner because otherwise there would be no crosslinking between resins (A) and (B) during the hot roller fixing. Thus the binder contains a copolymer having the requisite copolymer and reactive crosslinking groups.

It appears that the toner of Matsunaga would inherently have the same characteristics as present in instant claim 3 because the toner has the reference toner has a size of 11 microns, which is a size that would be formed by aggregation and coalescence of smaller particles.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga *et al.* in US Patent 5,262,265 in view of Diamond, Arthur S & David Weiss (eds.)

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Handbook of Imaging Materials. New York: Marcel-Dekker, Inc. (11/2001) pp. 155-164 & 173-187.

Matsunaga was discussed above and those remarks are incorporated here. Matsunaga does not appear to disclose the claimed average particle diameter of claim 11, the particle size distribution of claim 12, or the release agent of claim 14.

Diamond teaches on page 159 that the typical size of toner particles is 6 to 7 μm . Diamond also teaches that release agents, such as polyethylene or polypropylene wax, are typically added to toner formulations to improve offset resistance during the fixing process. Diamond further discloses that the particle size distribution should be minimized to prevent toner scattering giving "dirt" and copy quality problems (p. 187) and that the average size used is typically from 7 to 12 μm . Diamond states that the toner size distribution should be minimized to give better copy quality. Note the common concern in the specification at the bottom of page 27.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add a releasing agent to the toner of Matsunaga because this reduces the amount of toner offset during fixing, which is specific concern in Matsunaga (col. 1, l. 29-32, l. 66 – col. 2, l. 7). The artisan seeking to improve offset resistance in Matsunaga would look to additional references in the art to further improve this feature. The artisan would also have found it obvious to produce the toner with a size of about 6 to 7 μm with a narrow particle size distribution because Diamond teaches that smaller sized toner particles are currently used to improve line resolution and a narrow particle size distribution aid copy quality through use. The claimed GSDv value is seen as an optimization of the particle size distribution because this numeric value would approach 1 as the size distribution is minimized.

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Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga *et al.* in US Patent 5,262,265 in view of Carlson in US Patent 2,297,691.

Matsunaga was discussed above and those remarks are incorporated here. Matsunaga does not appear to disclose the claimed shape factor and surface index of claim 9. However, Carlson teaches that spherical toner particles are advantageous because this shape gives a more accurate distribution of the powder when developing a latent image (p. 3, left column, bottom, to right column, top).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the toner of the Matsunaga with a generally spherical shape because this shape gives a more accurate distribution of the powder when developing a latent image. The claimed SF-1 values appears to relate the sphericity of the toner and values closer to 100 give a more spherical shape (spec. p. 25; Example 2, p. 51; Example 4, p. 54). Thus the teaching in Carlson of a generally spherical shape implicitly teaches the artisan to obtain an SF-1 value near 100.

Claims 9, 10, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga *et al.* in US Patent 5,262,265 in view of Carlson in US Patent 2,297,691 as applied to claim 9 above, and further in view of Kojima *et al.* in US Patent 6,214,510.

Matsunaga and Carlson were discussed above and those remarks are incorporated here. Matsunaga does not appear to disclose the surface property index of the instant claims, but Kojima teaches that a toner having a surface property index of 2.0 or less gives improved transfer properties (col. 7, l. 4-32). Kojima also teaches that a SF1 value near 100 correlates to a spherical shaped toner as discussed above (col. 5, l. 11-50) and that a generally spherical shaped toner is advantageous. Further Kojima teaches that the colorant particle size in a toner

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should be from 10 nm to 1 μ m in order to avoid toner scattering (col. 10, l. 13-24). A colorant size of 250 nm is exemplified in Example 1 (col. 24, l. 5-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the toner of Matsunaga with a surface property index of 2.0 or less and a SF1 value near 100 because Carlson teaches that generally spherical toner gives a more accurate distribution of the powder when developing a latent image while Kojima teaches surface property index of 2.0 or less gives improved transfer properties. Improved transfer would be of interest to the artisan considering Matsunaga because toner transfer is specifically discussed by Matsunaga as a feature of the toner processes for that invention's toner (col. 1, l. 24). The artisan would also have found it obvious to optimize the size of the colorant in Matsunaga because Kojima teaches that specifically sized colorant reduces toner scattering and liberation of colorant particles from the toner.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Niinae discloses a toner in Preparation Example 6 having a monomers of lauryl methacrylate, acrylonitrile, and acrylic acid. Although these monomers meet the Tg and hydrophilic monomer requirements of the instant claims (see spec. pp. 19-20), acrylonitrile is not included within the scope of the instant claim's formulae for the high Tg monomer because the acrylonitrile's CN group is not one of the recited R groups.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher RoDee whose telephone number is 571-272-1388. The examiner can normally be reached on most weekdays from 6:00 to 4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cdr
14 April 2005



CHRISTOPHER RODEE
PRIMARY EXAMINER